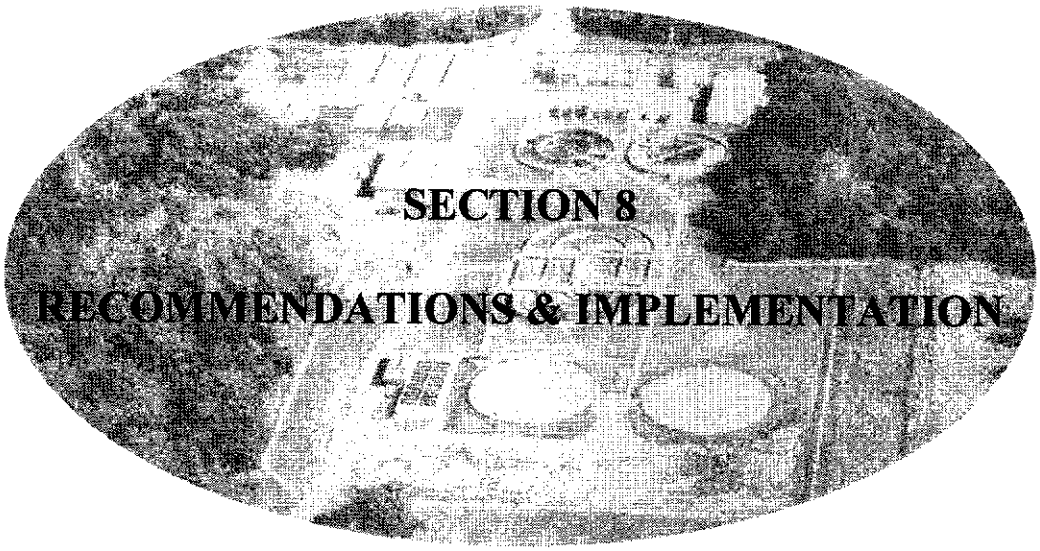


SECTION 8

RECOMMENDATIONS & IMPLEMENTATION

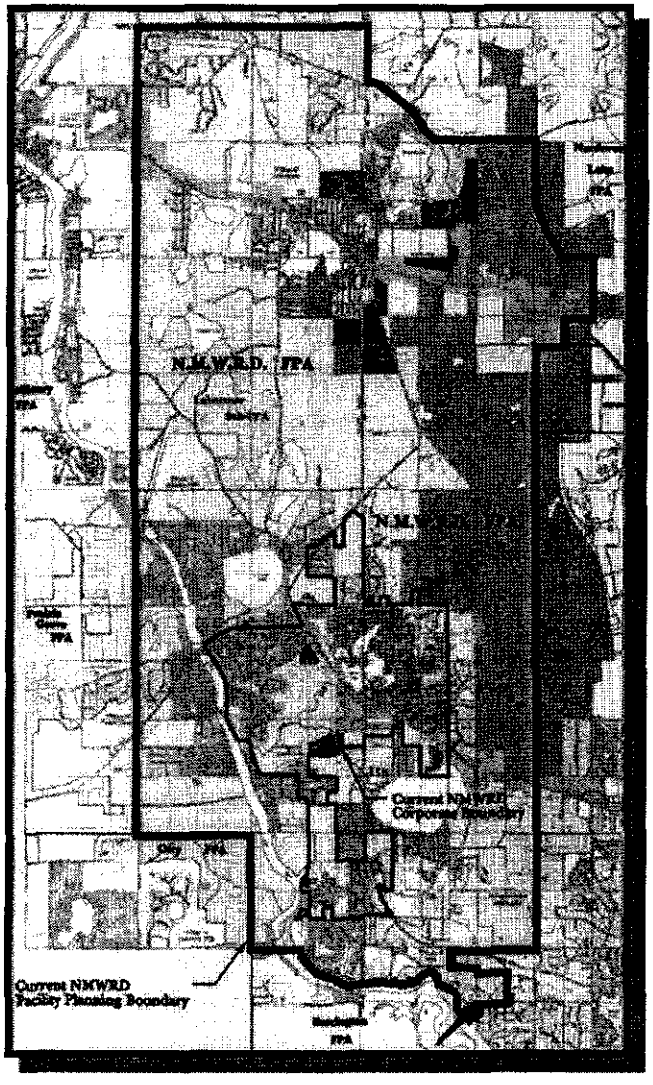
Exhibit KAM-1

Exhibit KAM-1

8. RECOMMENDATIONS AND IMPLEMENTATION

8.1 GENERAL BACKGROUND

The Northern Moraine Wastewater Reclamation District Facility Planning Area serves several communities. Each Village has updated its comprehensive plan to better identify land use, population densities, and service requirements. In response, the District has developed a comprehensive phasing plan for providing service to each of the communities.



The ultimate build-out for the service area is slightly greater than 100,000 population equivalents, which equates to a wastewater flow of 10.0 MGD. The District is committed to developing a phased approach to extending service throughout the Facility Planning Area. This commitment includes construction of interceptor sewers, regional lift stations and expanded treatment capacity.

The District is also dedicated to the continuous protection of the environment and has reviewed several approaches to offset the impacts of increased loading on the Fox River. The selected alternatives for minimizing the environmental impacts of growth include both advanced treatment and extension of service to existing developments that are currently using private septic systems.

The proposed design will incorporate biological nutrient removal for phosphorus and total nitrogen. The expanded wastewater treatment facility will also incorporate improvements to remove ammonia, solids and BOD_5 loading below the current NPDES permit concentrations.

Exhibit KAM-1

8.2 COLLECTION SYSTEM

8.2.1 Rehabilitation

Due to its limited age, the District's collection system is in very good condition. It is recommended that the District continue to expand its sanitary sewer maintenance program to maintain the integrity of the system. The District should be reinvesting approximately $230,000 per year in upgrades and replacement based on the value of the existing collection system.

8.1.2 Sewer Extensions

The current Facility Planning Area includes roughly 27 square miles. Historically, the District has extended the collection system as parcels became contiguous to the corporate boundary. The owner of each parcel was responsible for construction of the sewers through the parcel. The owners of parcels that were not contiguous were required to construct interceptors. They were allowed to recapture costs from intermediate owners as the property was developed. This approach has made sewer service financially impractical for several potential developments. As a result, several developments have been completed on individual well and septic systems due to lack of service availability. The District has created an approach to provide a more economical solution to this problem.

The proposed improvements would extend interceptor sewers to each major drainage basin within the Facility Planning Area. The cost of the sewer extensions would be incorporated into the connection fee. Therefore, each property within the District has an opportunity to obtain sewer service from the District.

Previously, the Village of Lakemoor identified an alternative to convey its wastewater to the NMWRD from proposed development. The report recommended the construction of dedicated force mains from the northern sub-basins to the District. However, this solution neglected the benefit of sharing costs with undeveloped properties along the force main route.

Interceptor Sewer Extension	Cost
Darrell Road Interceptor Sewer	
Darrell Road Interceptor Sewer (Phase I)	
Darrell Road Interceptor Sewer (Phase II)	
Darrell Road Interceptor Sewer (Phase III)	
Darrell Road Interceptor Sewer (Phase IV)	
Darrell Road Interceptor Sewer (Phase V)	
Lily Lake Road Interceptor Sewer	
Lily Lake Road Interceptor Sewer (Phase I)	
Lily Lake Road Interceptor Sewer (Phase II)	
Total Interceptor Sewers	

The interceptor sewers proposed within Section 3 provide capacity for all potential development within the Facility Planning Area, including the Village of Lakemoor.

Exhibit KAM-1

8.2 LIFT STATIONS

8.2.1 Lift Station Rehabilitation

Northern Moraine Wastewater Reclamation District owns and operates eleven lift stations throughout the District. They have been constructed over the past twenty-five years as the District has developed. Generally, the District's lift stations are in very good condition. It is recommended that the District reinvest approximately $50,000 per year in replacement and upgrades projects for the lift stations to maintain their reliability.

8.2.2 Construction of Regional Lift Stations

The District has allowed developers to install small lift stations to serve individual developments. The District has revised its approach to promote regional lift stations in an attempt to minimize the number of sites where practical. This will enable District staff to maintain and monitor these installations more efficiently.

The River Road Lift Station and Phase I Forcemain are proposed to serve the future development within the Central and Northwestern Drainage Basins. The River Road Force Main (Phase II) will be constructed once capacity of the Illinois Route 176 Interceptor sewer has been maximized. This forcemain will parallel the 24" interceptor to the treatment facility.

The Darrell Road Lift Station will be constructed after the second phase of the Darrell Road Interceptor Sewer. This lift station will serve development within the Eastern and Northeastern Drainage Basins.

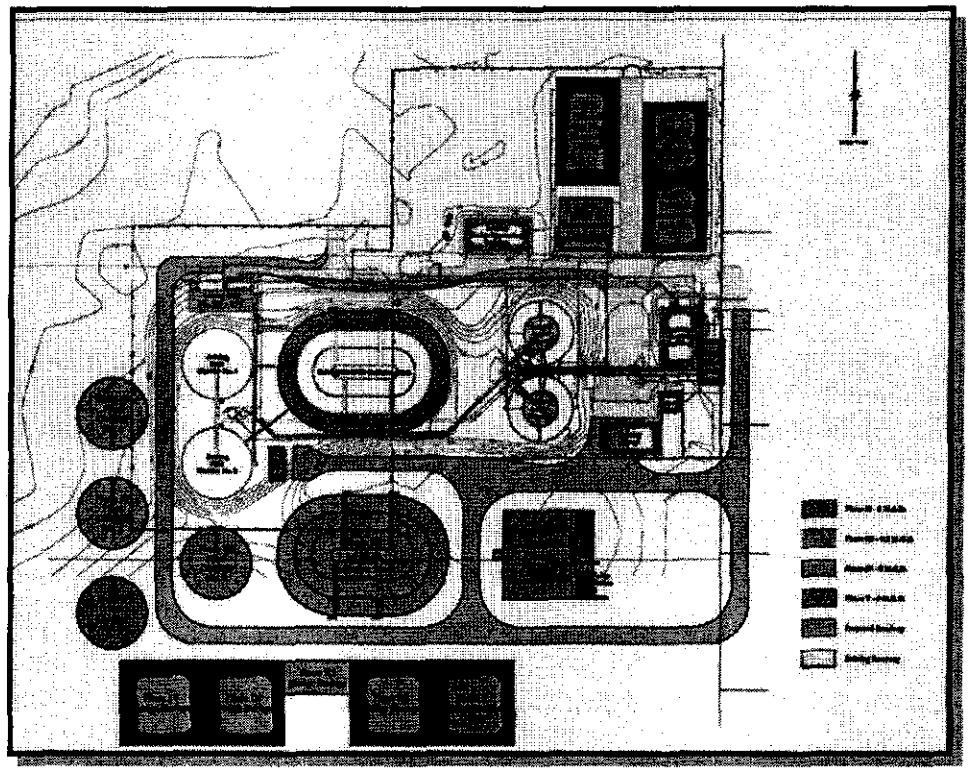
Proposed Regional Lift Stations	Fiscal Year	Cost
River Road Lift Station & River Road Forcemain (Phase I)	FY - 2006	$2,042,327.00
Darrell Road Lift Station	FY -2008	$1,913,390.00
River Road Forcemain (Phase II)	FY - 2010	$1,057,000.00
	Total =	**$5,020,000.00**

8.3 WASTEWATER TREATMENT FACILITY

The Phase I Expansion completed in 1998 set precedence for the future expansion of the facility. It was also agreed that the expansion to 10.0 MGD should be completed in a minimum of additional four phases. Therefore, the selected expansion-phasing program is as follows:

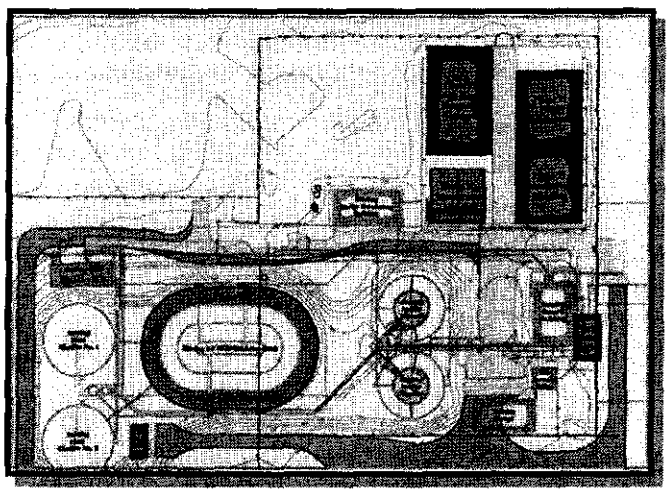
- **Phase I – 2.0 MGD - Completed 1998**
- **Phase II – 3.0 MGD**
- **Phase III = 4.5 MGD**
- **Phase IV – 6.0 MGD**
- **Phase V – 10.0 MGD**

As demonstrated in Section 5, the current loading to the treatment facility is between 70 and 80% of the design capacity. It is recommended that that the District proceed with the Phase II design to ensure adequate capacity is available for continued development. Each subsequent phase (Phase III, IV and V) should be constructed as the facility reaches 75% of its design capacity. The design parameters and anticipated discharge requirements for each phase are identified in Section 6.



8.3.1 PHASE II EXPANSION

Phase II will include expansion of the headworks structure capable of treating the ultimate Peak Hourly Flow. Screening equipment will be installed within each phase as required to provide sufficient treatment. The expansion will also incorporate process upgrades for biological phosphorus and total nitrogen removal providing superior effluent. The aerobic digestion system will be completely rehabilitated in addition to incorporating continuous membrane thickening capabilities. The thickening system will allow the District to waste and thicken biosolids on a continuous basis and better control the biological process. Furthermore, the higher solids concentration in the digesters will increase the operating temperature, detention time and efficiency of the process.



The Phase II Expansion improvements include:

- Site piping and roadway upgrades
- Expansion of the headworks
- Replacement of two raw sewage pumps
- Construction of a third ring on the oxidation ditch
- Construction of a RAS/WAS Pump Station
- Upgrades to the Aerobic Digestion Process

Other items incorporated into the Phase II Expansion to improve the District's Services include:

- New Sludge Storage Barn
- New Fleet Maintenance Garage
- Upgrades to the Operations Building
- New Administration Building

Phase II Expansion Cost

A summarized cost estimate for the Phase II Expansion is provided below.

SUMMARY
GENERAL CONDITIONS
SITE WORK
RAW SEWAGE LIFT STATION
HEADWORKS
OXIDATION DITCH
RAS/WAS PS & DIV STRUCTURE
CLARIFIERS
AEROBIC DIGESTION
SLUDGE STORAGE BARN
FLEET MAINTENANCE GARAGE
OPERATIONS BUILDING
ADMINISTRATION BUILDING
CONSTRUCTION SUB-TOTAL
CONTINGENCY
ESTIMATED CONSTRUCTION COST
DESIGN ENGINEERING (7%)
CONSTRUCTION ENGINEERING (6.5%)
PROJECT TOTAL

Approximately $3 million of the $12 million dollar expansion cost is attributable to the Sludge Barn, Garage, Operations and Administration Buildings. These items can be delayed to future phases if required by economic circumstances. As such, the Phase II Improvements could be broken into two projects. Expansion of the process is estimated to cost roughly $9 million dollars.

Phase II Process Expansion Only

SUMMARY
GENERAL CONDITIONS
SITE WORK
RAW SEWAGE LIFT STATION
HEADWORKS
OXIDATION DITCH
RAS/WAS PS & DIV STRUCTURE
CLARIFIERS
AEROBIC DIGESTION
SLUDGE STORAGE BARN
FLEET MAINTENANCE GARAGE
OPERATIONS BUILDING
ADMINISTRATION BUILDING
CONSTRUCTION SUB-TOTAL
CONTINGENCY
ESTIMATED CONSTRUCTION COST
DESIGN ENGINEERING (7%)
CONSTRUCTION ENGINEERING (6.5%)
PROJECT TOTAL

Phase II Expansion Schedule

Complete Facility Plan Amendment	**December 2004**
Facility Plan Submittal to NIPC	**January 2005**
Facility Plan Submittal to IEPA	**January 2005**
NPDES Permit Expansion to IEPA	**March 2005**
Begin Design	**May 2005**
Complete WWTP Final Engineering	**January 2006**
Complete NPDES & Construction Permitting	**March 2006**
Begin Construction of WWTP	**May 2006**
Complete Construction of WWTP	**June 2007**

Phase II Replacement Costs

WWTP Equipment Depreciation Schedule

	First Cost	Life Expectency	Depreciation @ 4%
Phase I Replacement Costs			
Fine Screen			
Progressing Cavity Pump			
RAS/ WAS Pump Station			
Raw Sewage Pumps			
Belt Filter Press			
Oxidation Ditch			
Centrifugal Blowers			
Diffusers			
Clarifiers			
Chlorination System			
BiSulfite System			
Polymer Unit			
Sampler			
Control System			
NPWSystem			
Remaining Infrastructure			
Phase II Replacement Costs			
Fine Screen			
Septage Receiving Unit			
Sampler			
Raw Sewage Pumps			
Oxidation Ditch			
RAS Pump			
Blowers			
Membrane System			
Aeration Equipment			
Conveyor			
Remaining Infrastructure Cost			
Total Replacement Cost			

8.3.2 Phase III Expansion –4.5 MGD

The Phase III Expansion will increase the hydraulic and biologic capacity of the facility from 3.0 to 4.5 MGD. The improvements would include the addition of one mechanical fine screen, two new raw sewage pumps, construction of a second 2.25 million gallon oxidation ditch, one new final clarifier, conversion of the chlorination system to U.V. Disinfection, sludge dewatering and storage facilities.

The 3.0 MGD facility operates as a single stage nitrification plant and is required to provide the equivalent of 4.5 cubic feet per P.E. in aerobic digestion capacity. When the plant is expanded to 4.5 MGD, the detention time within the biological process will be increased to 24 hours. The Illinois EPA recommended design standards for aerobic digestion on an extended aeration plant are 3.0 cubic feet per P.E. Therefore, the aerobic digestion facilities will not need to be expanded during the Phase III expansion.

The estimated cost for the improvements is estimated to be $9.2 Million dollars. Land acquisition for the expansion is easily accomplished. The estimated cost of the land acquisition is $600,000. A summary of the estimated costs is shown below.

SUMMARY	
GENERAL CONDITIONS	
SITE WORK	
RAW SEWAGE LIFT STATION	
HEADWORKS	
OXIDATION DITCH	
RAS/WAS PS & DIV STRUCTURE	
CLARIFIERS	
ULTRAVIOLET	
SLUDGE DEWATERING IMPROVEMENTS	
EAST SLUDGE STORAGE BARN	
WEST SLUDGE STORAGE BARN	
SUB-TOTAL CONSTRUCTION	
CONTINGENCY 10%	
CONSTRUCTION TOTAL	
DESIGN ENGINEERING	
CONSTRUCTION ENGINEERING	
PROJECT TOTAL	

8.4 ESTIMATED USER FEES

The District serves 3,170 residential customers @ $62 per quarter with a $12 discount provided for seniors. There are 64 metered accounts which are businesses are charged $3.70 per 1,000 gallons. The current sewer user rate is $2.07 per 1,000 gallons residential and $3.70 per 1,000 for commercial, which is estimated to generate roughly $1,376,000 in FY 2004/2005. Miscellaneous income, (i.e. inspections, interest etc.) equate to roughly $60,000. The Estimated FY 2004/2005 operational and maintenance costs are estimated to be $1,517,000 per year. Based on the low usage of the existing system, the user fee is barely capable of meeting the fund's needs for operation and maintenance. The replacement account is being funded through connection fees and the alternative revenue bond is funded through a dedicated revenue source.

The requirements of GASB 34 stipulate that the sewer fund structure address operation maintenance and replacement costs. After the expansion of the plant, the operation maintenance and replacement cost of the infrastructure will be as follows:

Expanded Operation & Maintenance Costs	**$2,000,000**
Pump Station Replacement Costs	**$50,000**
Collection System	**$230,000**
Expanded WWTP Replacement Costs	**$768,000**
Total Annual Operation, Maintenance & Replacement Cost	**$3,050,000**

The population projections provided in the comprehensive plan indicate that build-out of the District will provide an additional 85,000 P.E. It is estimated that the Facility Planning Area will expand to 60,000 P.E. over the next twenty years.

The estimated Average Daily Flow in year 2009 would be roughly 2.0 MGD. The estimated cost to operate the expanded facility is estimated to be 3,050,000. Based on an average billed volume of 2.0 MGD, the estimated revenue would be $2,201,600

It is recommended that the sewer user fees be increased over the next five years to fully fund the operation, maintenance, and replacement needs of the system. Based on an average daily flow of 2.0 MGD, the sewer user fees would need to be increased by 39% over the next five years. This increase equates to a 7% increase per year for the next 5 years.

8.5 ESTIMATED CONNECTION FEES

The current sewer connection fees are $3,965 per residential unit. The existing connection fee generally represents $1,132 per population equivalent. It has been agreed that the construction of the interceptor sewers, regional lift stations and treatment facility expansion should be incorporated into the connection fee.

The estimated costs for are summarized below.

Darrell Road Interceptor	**$9,100,000**
Lily Lake Road Interceptor	**$3,500,000**
River Road Lift Station	**$2,000,000**
River Road Forcemain (Phase II)	**$1,060,000**
Darrell Road Lift Station	**$1,900,000**
Phase II Expansion	**$12,000,000**
Total Construction Cost	**$29,560,000**

The District currently treats 1.25 MGD. The available capacity after the expansion is 1.75 MGD, which equates to 17,500 P.E. Based on the estimate of an additional 2,250 P.E. per year, it would take the District nine years before reaching capacity. If the District increased the connection fee by 39%, the revenues from new development would equate to $29,560,000 required to extend service and construct the expanded treatment facility. Therefore, the required connection fee would be $5,912 per residential unit to completely fund the improvements.

8.6 POLICY RECOMMENDATIONS

In the letter dated February 2, 1989, the Illinois EPA reaffirmed the District's status as the Designated Management Agency for the entire Facility Planning Area. As the Designated Management Agency, the District is responsible for the collection and treatment of wastewater throughout the Facility Planning Area.

The District Board is comprised of representatives from each of the communities within the District's corporate boundaries. Communities outside of the District's corporate boundaries area are served by agreement.

The 1917 Sanitary District Act stipulates that the Board shall have three trustees. The NMWRD corporate boundary is within both Lake and McHenry County. The Board is currently appointed by the State Legislature, based on recommendations of local officials. The size of the Board could be increased by the legislature to provide representation for each of the communities served. The areas that are not currently annexed to the District could also be incorporated into the corporate boundary through legislative action.

It is proposed that these amendments be requested and that all areas served be annexed to the District. The number of trustees would increase to seven members. Each community (Holiday Hills, Island Lake, Lakemoor, Port Barrington and Volo) could have representation. Two positions on the board would be reserved for at large members. Those positions could be utilized to represent existing developments that are not annexed to one of the aforementioned communities.

The District will be better able to fulfill its obligation to the affected communities through implementation of these legislative changes. The benefits of the changes include:

- Elimination of sanitary service agreements
- Fair representation for each of the affected communities
- Consistent user and connection fees
- Better tracking of approved development and available capacity

The original Water Quality Management Plan (WQMP) identified regionalization as the preferred solution. The updated water quality management plan is consistent with the original WQMP. The plan allows for phasing of the required improvements, which reduces the initial investment required for implementation. The proposed connection fees incorporate the cost of interceptor sewers, regional lift stations and treatment facility expansion. The connection fee is determined on a larger population base and provides a more economical solution.

Regionalization of treatment at the existing site has multiple benefits including:

- Minimizing environmental impacts on the Fox River
- Phased expansion of the treatment capacity
- More efficient operation
- Consolidation of operational staff
- Reduced Operation, Maintenance and Replacement Costs
- Reduced user fees

Lastly, implementation of the phased plan can be readily executed without fully funding all of the proposed improvements prior to commencement of construction. As such, extensions of service can proceed without delay.